Transportation Fuel Supply/Demand Balances

Inputs and Methods for the 2013 Transportation Energy Demand Forecast

Hearing Room A

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Presentation Topics

- Petroleum supply/demand balance – perspective & purpose
- Petroleum balance – goal, accuracy & uncertainty
- Transportation fuels – background
- Data sources
- The Good, the Bad, and the Ugly
- Petroleum flows – refineries, marine movements & pipeline exports
- Transportation fuel import/export forecast methodology
- Jet fuel balances – sources, numbers & issues

Petroleum Balance - Perspective

- The petroleum balance is not…
  - A model created using software

- The petroleum balance is…
  - An accounting balance from multiple data sources compiled in an Excel spreadsheet
  - Majority of the *quality* information sources are either confidential or proprietary in nature

Petroleum Balance - Purpose

- Improve understanding of transportation fuel flows
  - Into, out of, and within the state
- Results serve several agendas
  - Development of historical and regional fuel consumption estimates
  - Identification of changing trends
    - Shift from a net importer to a net exporter
    - Gasoline demand shifting from a growth trend to a decline trend
  - Transportation fuel infrastructure assessments
    - Pipeline & marine terminal capacity
    - Low Carbon Fuel Standard (LCFS) renewable fuels infrastructure needs
  - Various Energy Commission reports
    - Integrated Energy Policy Report (IEPR)
  - Presentations for conferences & other venues
  - Respond to requests for information

Petroleum Balance – Goal

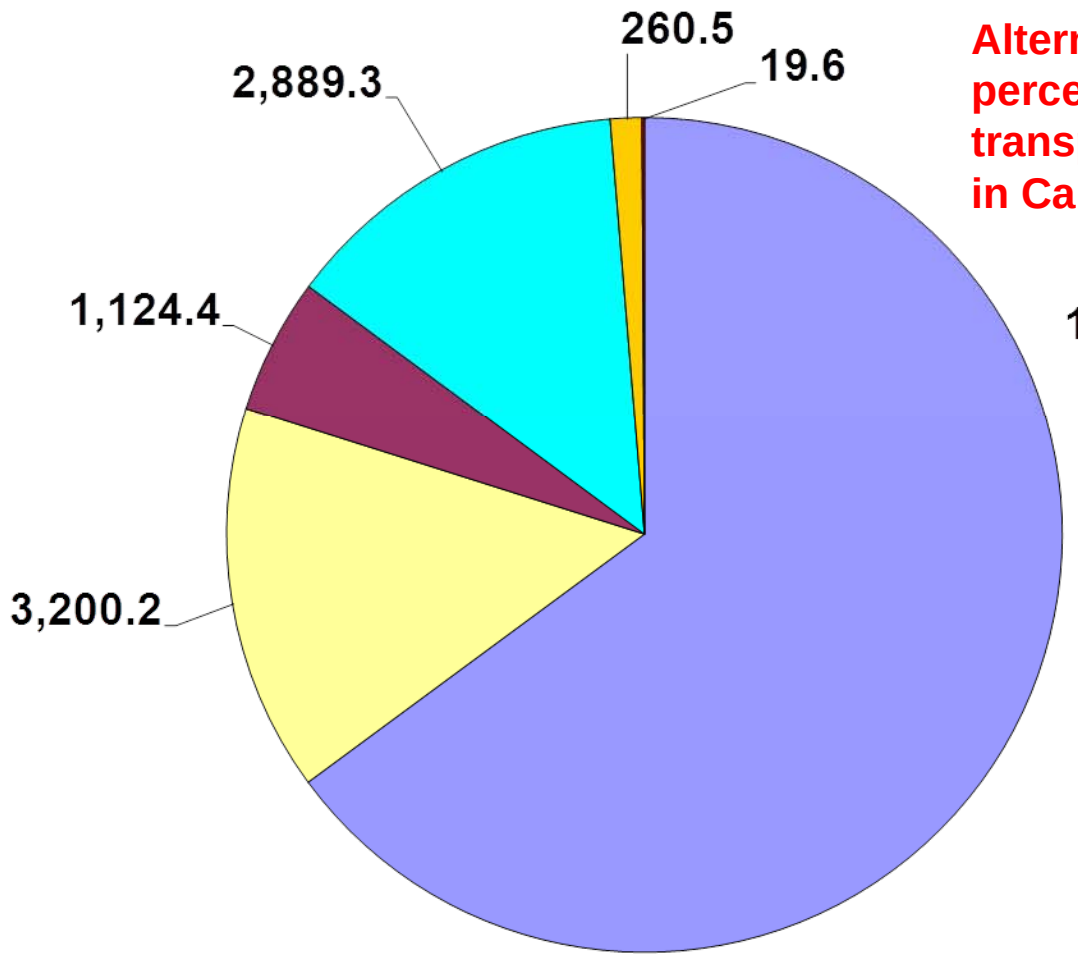
Transportation fuel supplied should equate to demand/consumption

Accuracy & Uncertainty

- Progression of accuracy
  - Start with the data sources that are the most accurate
- Secondary analysis should include data resources that have greater uncertainty
- Final steps will involve “filling in the blanks” through deduction or educated estimates
- Goal should be to minimize the level of uncertainty

California's Transportation Fuels

2009 California Use of Liquid Transportation Fuels (Millions of Gallons)

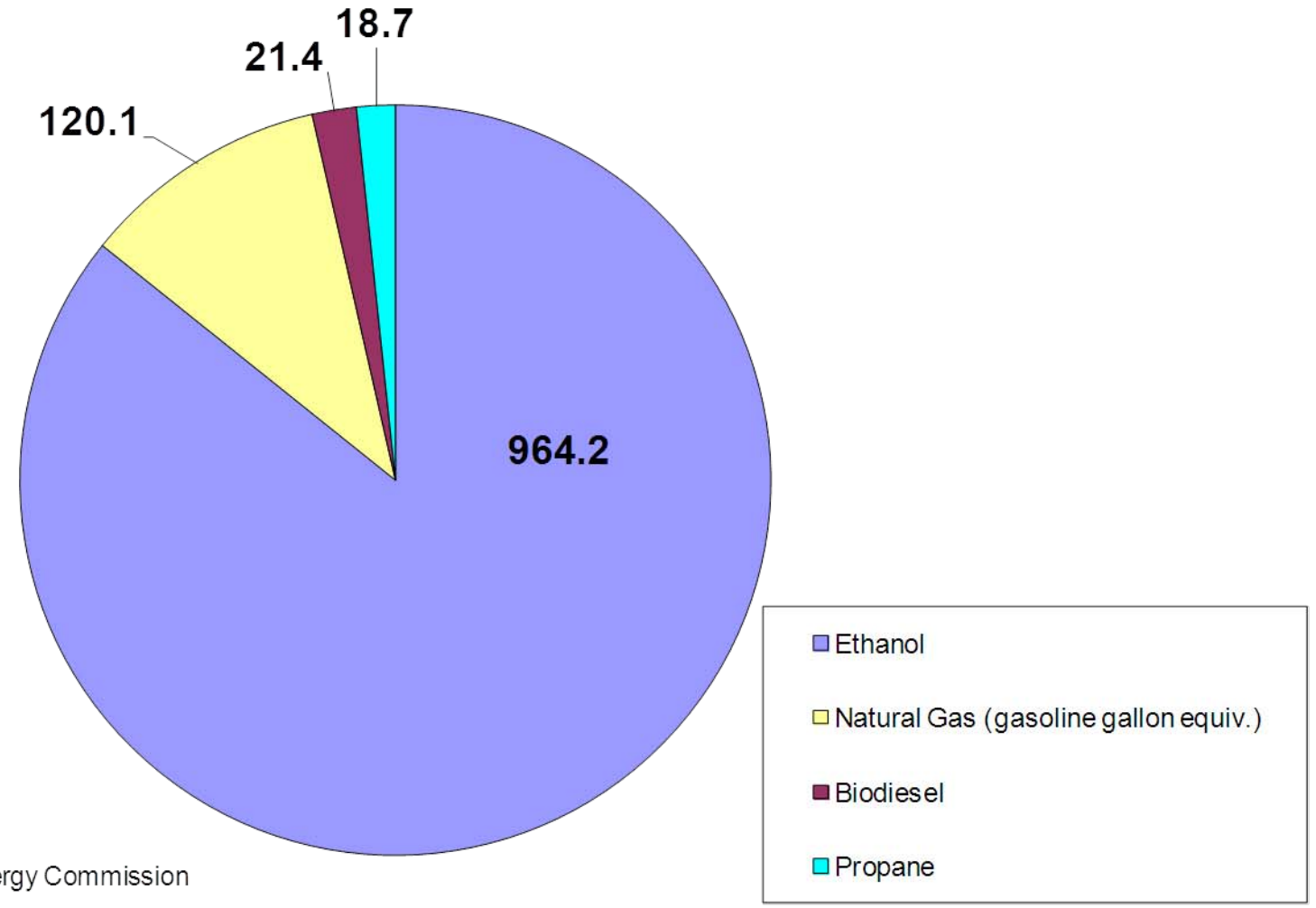


Alternative fuels represented 5.3 percent of total liquid transportation fuel consumption in California during 2009

- Gasoline (less ethanol)
- Diesel Fuel
- Alternative Fuel Use
- Commercial Jet Fuel
- Military Jet Fuel
- Aviation Gasoline

Source: California Energy Commission

2009 California Use of Alternative Fuels (Millions of Gallons)



Source: California Energy Commission

Petroleum Balance – Data Sources

- Petroleum Industry Information Reporting Act (PIIRA)
  - Analytical backbone of the Transportation Energy Office
  - Information is confidential on a company-specific basis
  - Staff access is limited & tightly controlled
  - Refinery production, imports, exports, inventory levels
- Proprietary Information
  - Port Import/Export Reporting Service (PIERS)
    - Dept of Commerce data – foreign imports and exports via marine vessel
  - Platts cTrack
    - Real-time marine vessel tracking system and historical shipment database
  - Pacific West Oil Data
    - Transportation fuel demand in neighboring states

Petroleum Balance – Data Sources

- Open Source
  - California State Board of Equalization (BOE)
    - Taxable gasoline sales
    - Taxable diesel fuel sales
    - Dyed diesel fuel volumes
  - Energy Information Administration (EIA)
    - Regional marine movements
    - Company-level imports by state
  - U.S. Army Corps of Engineers (Corps)
    - State-to-state marine movements
  - Defense Energy Support Center (DESC)
    - Military fuel contracts by facility/base
  - State Lands Commission (SLC)
    - Loads and discharges of liquid fuels by marine terminal

Data Sources – Sergio Leone Style

Data Sources – High Confidence

- PIIRA Information
  - Refinery production
  - Marine imports & exports
- Kinder Morgan pipeline exports
  - Deliveries via pipeline to locations in Arizona & Nevada
- BOE taxable gasoline sales

Data Sources – Safe to Use

- PIERS Imports & Exports
  - Only foreign imports & exports
- State Lands Commission
  - No import origin or export destination
- CARB imports
  - Only CARB gasoline & diesel fuel
- EIA – Company level imports
- Platts cTrack
- Pac West

Data Sources – Not So Fast!

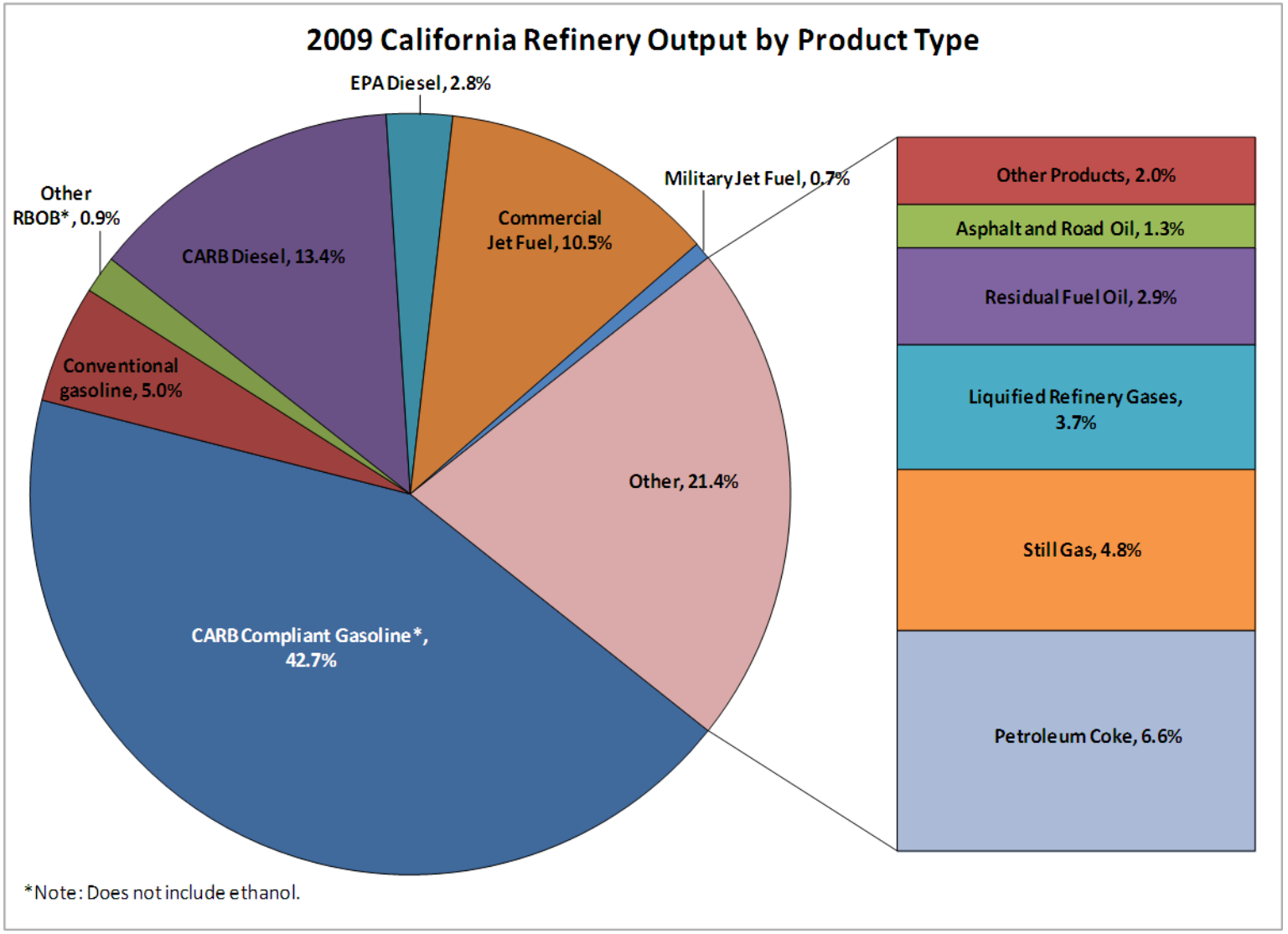
- DESC
  - Contracted volumes not actual deliveries
- EIA – prime supplier
  - Not demand!
- EIA – PADD marine movements
  - Only regional – Gulf Coast to West Coast - Uncertainty regarding which West Coast state receives cargo
- BOE – taxable diesel sales
  - Missing gallons - need dyed diesel fuel volumes
- US Army Corps – marine imports and exports
  - Lacks product specificity
    - Gasoline category includes conventional & California gasoline, as well as blending components
    - Distillates category includes CARB & EPA diesel fuel, as well as jet fuel
  - Significant time lag of data availability

California's Petroleum Flows

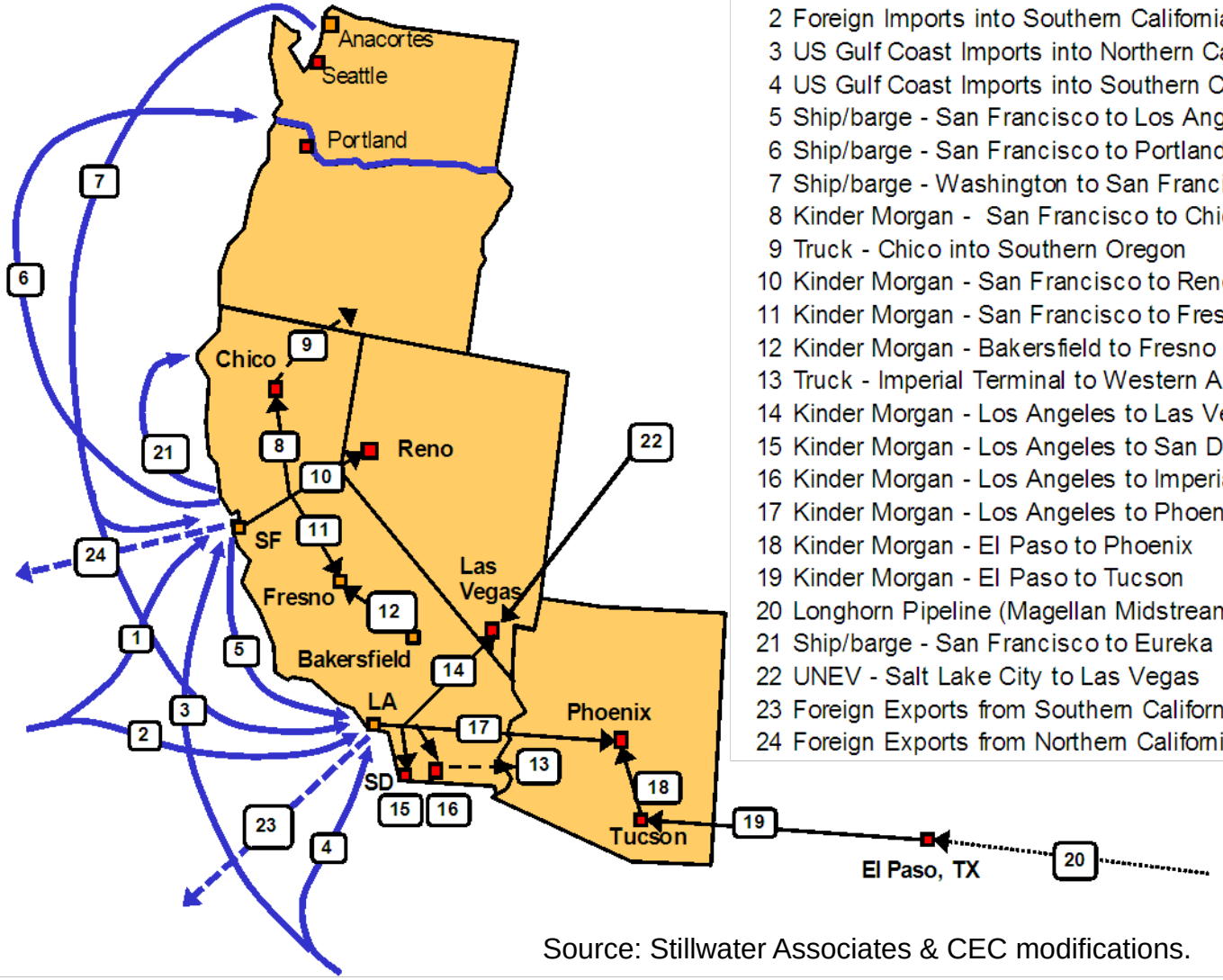
Refineries

- PIIRA
  - Weekly & monthly production by type of petroleum product and refinery location
- 20 refineries in 3 primary areas:
  - Bay Area
  - Los Angeles
  - Bakersfield
- 13 refineries currently produce transportation fuels that meet California standards

California Refineries – Calif. & Export Fuels



Western States – Fuel Flows



1 Foreign Imports into Northern California
2 Foreign Imports into Southern California
3 US Gulf Coast Imports into Northern California
4 US Gulf Coast Imports into Southern California
5 Ship/barge - San Francisco to Los Angeles
6 Ship/barge - San Francisco to Portland
7 Ship/barge - Washington to San Francisco and Los Angeles
8 Kinder Morgan - San Francisco to Chico
9 Truck - Chico into Southern Oregon
10 Kinder Morgan - San Francisco to Reno
11 Kinder Morgan - San Francisco to Fresno
12 Kinder Morgan - Bakersfield to Fresno
13 Truck - Imperial Terminal to Western Arizona
14 Kinder Morgan - Los Angeles to Las Vegas
15 Kinder Morgan - Los Angeles to San Diego
16 Kinder Morgan - Los Angeles to Imperial
17 Kinder Morgan - Los Angeles to Phoenix
18 Kinder Morgan - El Paso to Phoenix
19 Kinder Morgan - El Paso to Tucson
20 Longhorn Pipeline (Magellan Midstream Partners, L.P.)
21 Ship/barge - San Francisco to Eureka
22 UNEV - Salt Lake City to Las Vegas
23 Foreign Exports from Southern California
24 Foreign Exports from Northern California

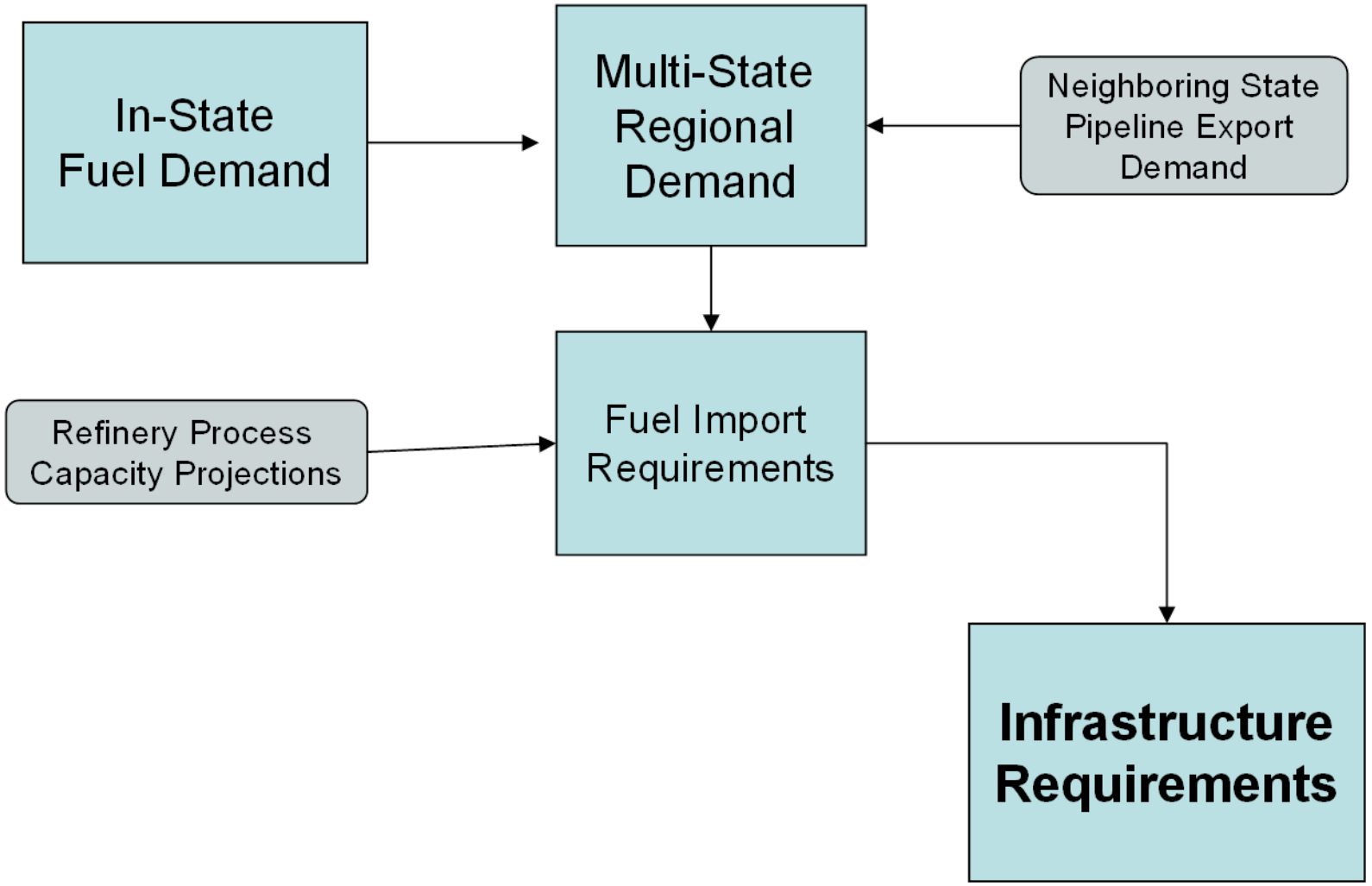
Source: Stillwater Associates & CEC modifications.

Southwest Pipeline Movements

- California refiners supply most of the transportation fuels for Nevada and nearly half of the supply for Arizona
- Arizona is also supplied by refiners located in West Texas and New Mexico
- Nevada has recently started receiving fuels from Salt Lake City refiners

Source: Kinder Morgan Pipeline Company.

Fuel Import/Export Forecast - Methodology



Incremental Imports - Approach

- Changing levels of petroleum & renewable transportation fuel imports through the marine infrastructure in California will be influenced by the following primary factors:
  - Change in California fuel demand
  - Increased use of renewable fuels
  - Degree of increased or decreased California refinery output
- Changing levels of transportation fuel exports to AZ and NV will be influenced by:
  - Change in AZ & NV fuel demand
  - New pipeline infrastructure – UNEV system
- Identify potential issues that need to be addressed over the near and mid-term

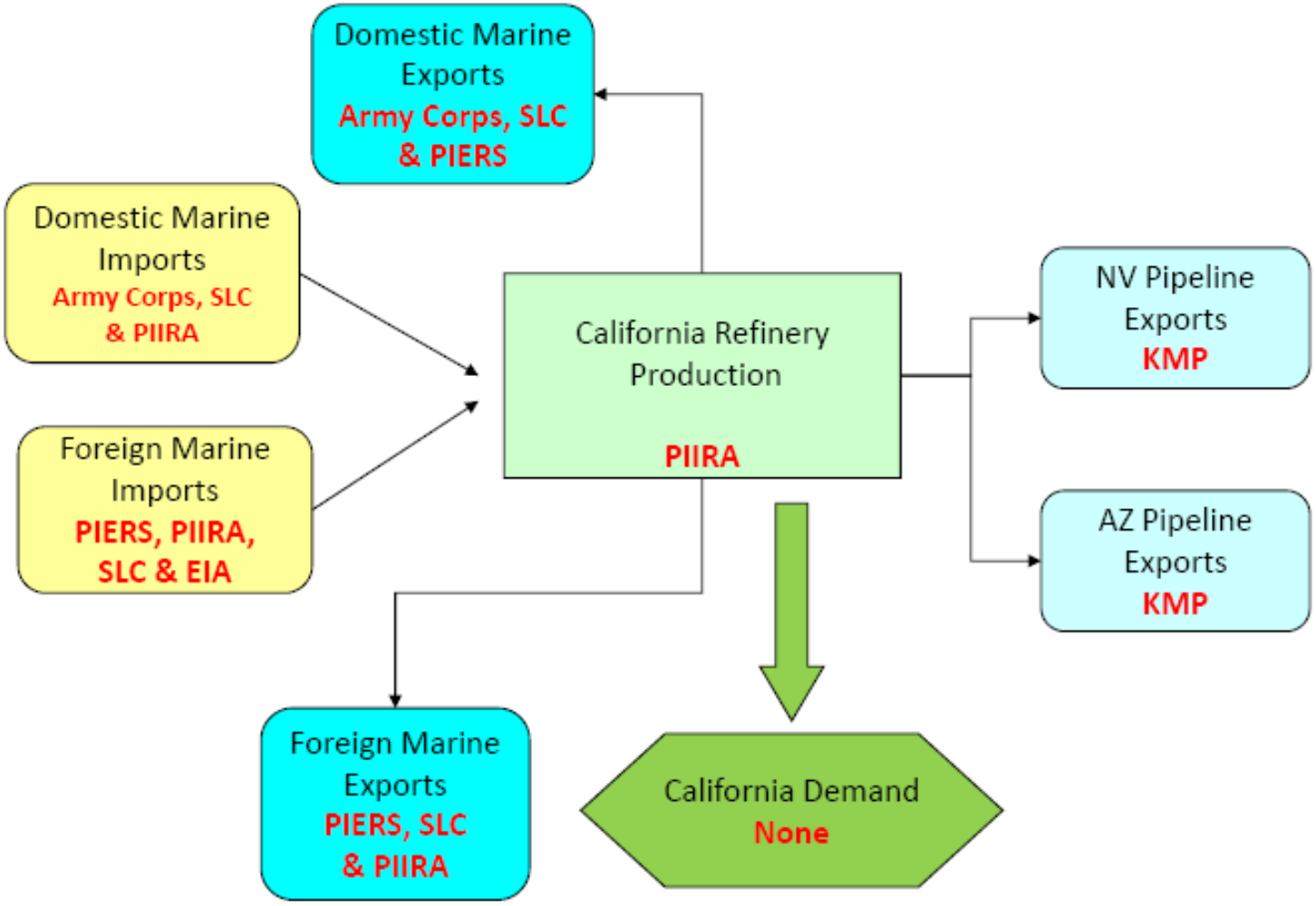
Marine Infrastructure Issues

- Key Questions
  - Will there be sufficient capability to import renewable fuels via marine terminals if California refiners require significant quantities of Brazilian ethanol to help meet LCFS obligations?
  - What is the status of projects and capabilities outside of California to receive and transfer biofuels from foreign sources to rail cars?
  - Would this newly-created infrastructure be able to supply the majority of California's forecasted needs for foreign-sourced biofuels?
  - Will the Long beach marine terminal proposed by Vopak be approved and constructed? – If so, how soon and what additional marine handling capacity could be achieved?

Distribution Terminal Infrastructure

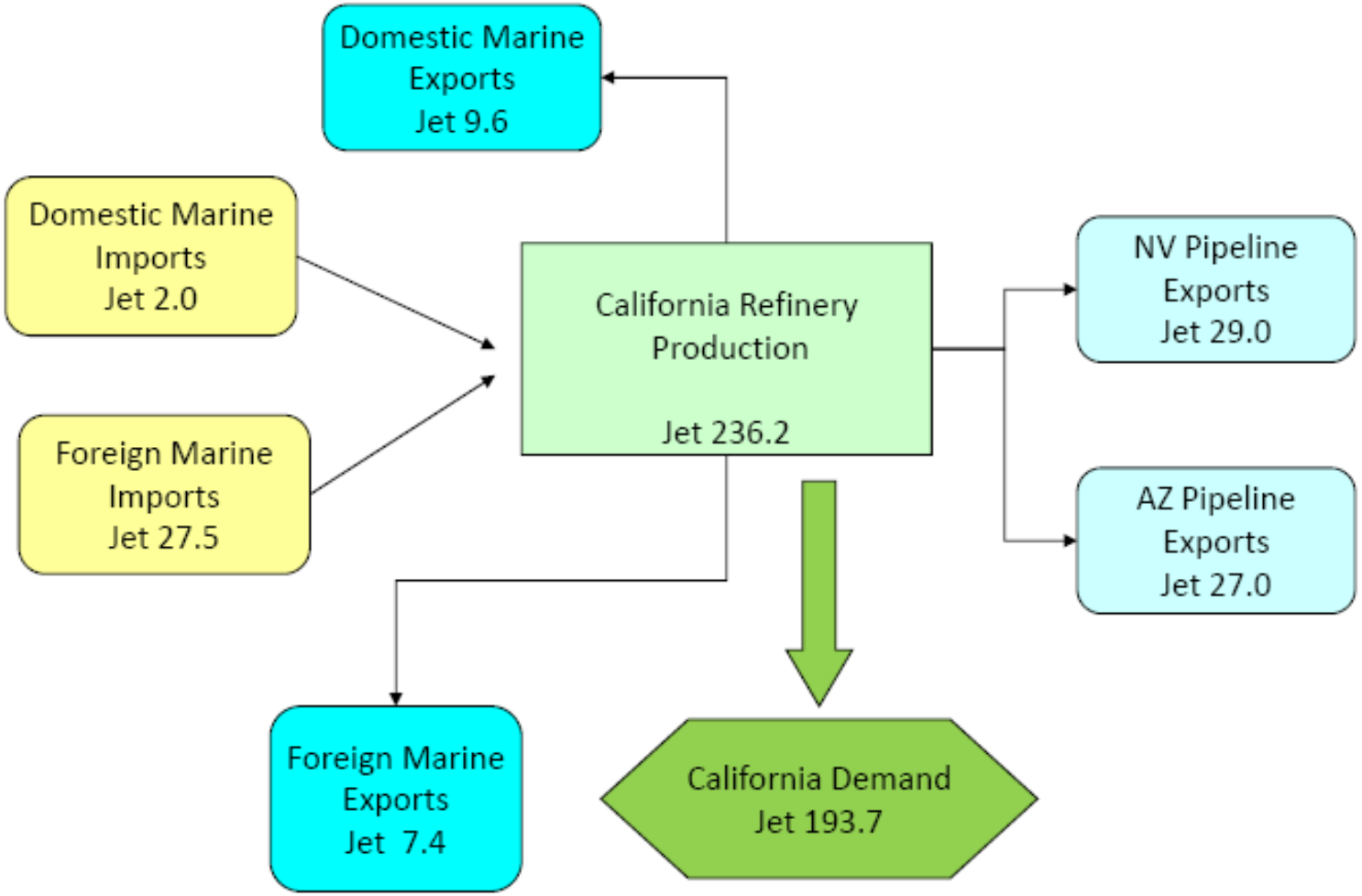
- More than 50 distribution terminals in California are used to load tanker trucks that are primarily destined for a retail station
- Ethanol and biodiesel are normally delivered to these terminals via tanker truck
- Key Questions
  - What is the status of biodiesel storage and distribution capability at terminals, as well as unresolved issues?
  - What are the expectations for renewable hydrocarbon ("drop-in") fuel production, either produced in-state or imported from other sources?
  - Do renewable diesel imports via rail cars have unresolved distribution issues?
  - What is the supply potential for renewable natural gas & what issues remain unresolved?

Jet Fuel Balance – Information Sources



Source: California Energy Commission

Commercial Jet Fuel Balance – 2009 Example
Thousands of Barrels Per Day



Source: California Energy Commission

Commercial Jet Fuel – Regional Flows

2009 Commercial Jet Fuel Supply/Demand Balance (MBPD)						
	Commercial Jet Fuel					
	Northern[1] California	Southern California	Total California	Nevada	Arizona	Total Region
DEMAND (Consumption)[2]	**70.30**	**123.37**	193.67	**28.99**	**30.82**	**253.48**
SUPPLY	70.30	123.37	193.67	28.99	30.82	
Refinery Production[3]	96.13	140.09	236.23			**236.23**
Refinery Inventory Change	0.19	0.70	0.89			**0.89**
Marine Imports (Exports)						
Foreign Imports	2.62	24.91	27.53			**27.53**
Foreign Exports	-6.91	-0.49	-7.40			**-7.40**
Domestic Imports	1.95	0.06	2.00			**2.00**
Domestic Exports	-6.35	-3.27	-9.62			**-9.62**
From Washington[4]			0.00			**0.00**
US Gulf Coast Imports		0.00	0.00			**0.00**
US Gulf Coast Exports	0.00		0.00			**0.00**
From Northern California	-16.27	16.27				**0.00**
From Southern California[5]	1.02	-1.02				**0.00**
Marine Subtotal	*-23.94*	*36.45*	*12.51*	*0.00*	*0.00*	***12.51***
Pipeline Imports (Exports)						
From Northern California[6]	-2.08		-2.08	2.08		**0.00**
From Southern California[7]		-53.88	-53.88	26.91	26.97	**0.00**
From Texas[8]					3.85	**3.85**
Pipeline Import Subtotal	*-2.08*	*-53.88*	*-55.96*	*28.99*	*30.82*	***3.85***
Truck Imports (Exports)						
From Northern California						**0.00**
From Southern California						**0.00**
From Nevada[9]						**0.00**
From New Mexico[9]						**0.00**
From Utah[10]						**0.00**
From Mexico						**0.00**
Truck Imports Subtotal	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	***0.00***
TOTAL BALANCE	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**253.48**

Source: California Energy Commission

Commercial Jet Fuel – Footnotes

Notes:

1. Northern California is geographic region north of the Tehachapi Mountains.
2. Demand figures are derived. No reliable end-use data available.
3. Refinery production is from PIIRA weekly or monthly data
4. Army Corps & PIIRA movements.
5. SLC & PIIRA movements.
6. KMP pipeline shipment total from N Calif to Reno terminal.
7. KMP pipeline shipment totals from S Calif to Phoenix, Tucson, and Las Vegas terminals.
8. KMP pipeline shipment totals from El Paso, TX to Phoenix and Tucson terminals.
9. Information obtained from Arizona Weights and Measures.
10. Information obtained from Nevada Energy Office.

Military Jet Fuel – Regional Flows

2009 Military Jet Fuel Supply/Demand Balance (MBPD)						
Military Jet Fuel						
	Northern[1] California	Southern California	Total California	Nevada	Arizona	Total Region
DEMAND (Consumption)[2]	7.77	9.22	16.99	5.39	5.54	27.93
SUPPLY	7.77	9.22	17.00	5.40	5.54	**27.93**
Refinery Production[3]	12.70	1.90	14.60			**14.60**
Refinery Inventory Change	-0.137	0.047	-0.09			**-0.09**
Marine Imports & Exports						
Foreign Imports	0.00	0.00	0.00			**0.00**
Foreign Exports	-0.22	0.00	-0.22			**-0.22**
Domestic Imports (Place Holder)	0.00	11.46	11.46			**11.46**
Domestic Exports	0.00	0.00	0.00			**0.00**
From Washington[4]	-0.42		-0.42			**-0.42**
From US Gulf Coast			0.00			**0.00**
From Northern California	-2.48	2.48				**0.00**
From Southern California[5]						**0.00**
Marine Subtotal	*-3.13*	*13.94*	*10.82*	*0.00*	*0.00*	***10.82***
Pipeline Imports (Exports)						
From Northern California[6]	-1.41		-1.41	1.41		**0.00**
From Southern California[7]		-6.57	-6.57	3.73	2.84	**0.00**
From Texas[8]					2.60	**2.60**
Pipeline Import Subtotal	*-1.41*	*-6.57*	*-7.98*	*5.14*	*5.44*	***2.60***
Truck Imports (Exports)						
From Northern California						**0.00**
From Southern California	-0.26	-0.10		0.26	0.10	**0.36**
From Nevada						**0.00**
From Oregon[9]	0.01		0.01			**0.01**
From Utah						**0.00**
From Mexico						**0.00**
Truck Imports Subtotal	*-0.25*	*-0.10*	*0.01*	*0.26*	*0.10*	***0.37***
TOTAL BALANCE	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**

Source: California Energy Commission

Military Jet Fuel – Footnotes

1. Northern California is geographic region north of the Tehachapi Mountains.
2. Demand figures are derived from DESC solicitation and amendment data. No reliable end-use data available. Adjustments are made based on deliveries through the KMP system.
3. Refinery production is from PIIRA weekly or monthly data
4. Army Corps & PIIRA movements.
5. SLC & PIIRA movements.
6. KMP pipeline shipment total from N Calif to Reno terminal.
7. KMP pipeline shipment totals from S Calif to Phoenix, Tucson, and Las Vegas terminals.
8. KMP pipeline shipment totals from El Paso, TX to Phoenix and Tucson terminals.
9. DESC solicitation and amendment volumes for Humboldt Coast Guard Air Station.

Military Jet Fuel – 2009 S. Calif. Solicitations

				Volume	Volume	Volume	Delivery Capability (%)	
Delivery Location	State	Location	Product	Gallons	Thous Barrels	TBD	Pipeline	Truck
29 Palms MCB	CA	Twentynine Palms	JP-5	600,000	14.3	0.04		100
29 Palms MCB	CA	Twentynine Palms	JP-8	1,500,000	35.7	0.10		100
Armed Forces Reserve Center	CA	Los Alamitos	JP-8	1,200,000	28.6	0.08		100
BAE Sysems (AF KC135)	CA	Mojave	JP-8					100
BAE Sysems (AF Q4 PROG)	CA	Mojave	JP-8	50,000	1.2	0.00		100
BAE Sysems (Navy)	CA	Mojave	JP-8					100
Camp Pendleton MCAF	CA	Pendleton	JP-8	30,000	0.7	0.00		100
Camp Pendleton MCB	CA	Pendleton	JP-5	5,000,000	119.0	0.33		100
Camp Pendleton MCB	CA	Pendleton	JP-8	800,000	19.0	0.05		100
Carson DFSP	CA	Carson	JP-8	6,075,972			100	
Channel Island ANG	CA	Point Hueneme	JP-8	1,500,000	35.7	0.10		100
China Lake NWC	CA	China Lake	JP-8	9,000,000	214.3	0.59		100
Edwards AFB	CA	North Edwards	JP-5	100,000	2.4	0.01		100
Edwards AFB	CA	North Edwards	JP-8	19,000,000	452.4	1.24	100	
El Centro NAF	CA	El Centro	JP-8	15,000,000	357.1	0.98	100	
Fort Irwin	CA	Fort Irwin	JP-8	4,000,000	95.2	0.26		100
March ARB	CA	Riverside	JP-8	18,000,000	428.6	1.17	100	
Miramar MCAS	CA	San Diego	JP-5	35,000,000	833.3	2.28	100	
Miramar MCAS	CA	San Diego	JP-8					100
North Island NAS	CA	San Diego	JP-5	15,000,000	357.1	0.98	100	
Pacomia Air Operations Division	CA	Pacoima	JP-8	300,000	7.1	0.02		100
Point Loma DFSP	CA	San Diego	JP-5	70,500,000			100	MV
Point Loma DFSP	CA	San Diego	JP-5		0.0	0.00	100	MV
DET1 Plant 42	CA	Palmdale	JP-5	100,000	2.4	0.01		100
DET1 Plant 42	CA	Palmdale	JP-8	1,000,000	23.8	0.07		100
San Diego CGAS	CA	San Diego	JP-5	300,000	7.1	0.02		100
San Pedro DFSP	CA	San Pedro	JP-5	7,380,000			100	MV
San Pedro DFSP	CA	San Pedro	JP-5	80,000	1.9	0.01	100	MV
San Pedro DFSP	CA	San Pedro	JP-8	62,380,000			100	MV
Ventura Naval Base	CA	Point Mugu	JP-5	1,500,000	35.7	0.10		100
Ventura Naval Base	CA	Point Mugu	JP-8	6,500,000	154.8	0.42		100
Watson DFSP	CA	Watson	JP-8	98,000,000			100	
Vandenburg AFB	CA	Vandenburg	JP-8	500,000	11.9	0.03		100
Southern California Totals						8.88	TBD	

Source: California Energy Commission

Jet Fuel Balance - Issues

- PIERS data
  - Does not specify military or commercial jet fuel
- U.S. Army Corps
  - Significant lag time & lack of product specificity
- West Coast intrastate movements
  - SLC data has no “point of origin” or “destination port”
  - Must “follow-the-ship” to discern voyage round trip timelines
- Must also calculate military jet fuel balance
  - DESC contract volumes are not actual deliveries & on federal FY cycle
  - But recently changed solicitation process to calendar year
- Must estimate NV & AZ demand + their imports
  - Rail imports of jet fuel have occurred but are sporadic and difficult to track